DOCUMENT RESUME

ED 027 901 JC 690 143

By-Foncannon, Howard F.

Technical Education in American Higher Education.

Pub Date [69]
Note-7p.; Paper presented at the National Clinic on Technical Education (St. Louis, March 26-28, 1969).
EDRS Price MF-$0.25 HC-$0.45
Descriptors-*Junior Colleges, *Science Education, *Subprofessionals, *Technical Education

This report follows one on a July 1968 meeting of the Science Education Commission which noted the popular misconception of the "status" of technical education that plagues the scientific community and the resulting need to identify "technical" more closely with "higher" education. Development and use of new teaching aids were also urged. Reconvening in October 1968, the Commission agreed that need for technicians is still critical, that colleges must strengthen their programs (particularly with more funds now available), and that present problems must be alleviated concurrently with work on new ways to meet mounting and changing needs. One proposal reviewed (among several) was the re-organization of colleges into communications, behavioral science, social science, science and math, and humanities departments--each with its related technologies. The Task Force on Science Education was urged to make the plight of technical education known to all scientists and enlist their help in its improvement, and to continue its study of two projects--on innovation and experimentation and on cooperative work-study. Five other projects were specified for the Task Force. It was concluded that colleges must devise new systems of technical education to replace the old predetermined offerings, that "status" must be clarified before student needs can be met, and that the increasing complexity of technology makes it essential to bring scientists and educators together. (HH)

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

TECHNICAL EDUCATION IN AMERICAN HIGHER EDUCATION

Prepared for

The National Clinic on Technical Education
St. Louis, Mo., 26-28 March 1969

Howard F. Foncannon, Coordinator,
Technical Education Project, AAAS Commission on Science Education

The Commission on Science Education of the American Association for the Advancement of Science welcomes the opportunity to participate in the program of the National Clinic on Technical Education.

The Commission, supported by the National Science Foundation, has an overall responsibility for the identification of problems in science education and the recommendation or administration of action programs directed toward their alleviation, especially in interdisciplinary areas or in areas which do not fall directly within the missions of other agencies. To date, the major activity of the Commission has been the development of a science education program for grades K-6, Science--A Process Approach. Materials for the earlier years of this program are now in use. The project will be completed in September 1969. Other interests of the Commission have been support of the International Clearinghouse on Science and Mathematics Curricular Developments, studies of the preservice education of elementary school teachers, out-of-school science learning resources, and junior college teachers of science and mathematics.

In 1966 the Commission appointed a subcommittee to begin a review of the status of science in vocational and technical education. As a first step, the Commission sponsored a session on technical education at the 1966 annual meeting of the American Association for the Advancement of Science. The papers presented at this meeting were published in the March 1967 issue of Science Education News.

At the February 1968 meeting of the Commission, it was decided that the problems of science in technical education are of such rapidly growing importance that they warranted increased attention. Accordingly, the status of the subcommittee on vocational and technical education was changed to that of a Task Force,* a small administrative staff was employed, and the Technical Education Project was launched within the same month.

JC 690 143

*The present membership of the Task Force on Technical Education is as follows: Burton H. Colvin, Head, Mathematics Research Laboratory, Boeing Scientific Laboratories (Chairman); William T. Kabisch, Assistant Executive Officer, American Association for the Advancement of Science; William C. Kelly, Director, Office of Scientific Personnel, National Research Council; and Vincent J. Schaefer, Director, Atmospheric Sciences Research Center, University of New York, Albany.

The first major activity undertaken by the Task Force was the convening of the AAAS Conference on Science in Technical Education, which was held in Washington, D. C., on 22-23 July 1968. The conference was attended by about fifty leaders in technical education from government, education, and industry. Members of the conference gave careful consideration to a wide range of problems which had been grouped within three main categories: (1) The Place of Technical Education in the American Educational System; (2) Institutions, Students, and Teachers; and (3) Offerings in Technical Education Programs. The recommendations of the conference, and the conclusions of the Commission based on the recommendations, have been published by the AAAS in Technical Education: A Growing Challenge in American Higher Education. JC 690 013

The title of the report reflects the deep concern expressed many times in the conference about the status of technical education in junior and community colleges and technical institutes in the minds of the public and within other sectors of the educational system. The discussions brought out the feeling that many of the problems of technical education could be solved with comparative ease if the general public and the educational community recognized more clearly the differences between vocational, technical, and professional education, and that programs for the training of technicians are, in fact, at the level of higher education. (The conference limited its discussions to problems of education for the physical science related technical occupations, and did not consider the somewhat different problems in education for the technical occupations related primarily to the biological sciences.)

A basic problem in all of American education has been the assumption on the part of the public--and to a certain extent among educators--that there is increasing honor on the part of the student as he progresses through successively "higher" levels of education--and the same applies to teachers. There must come a realization of the simple truth that education exists equally to serve the needs of every individual, no matter how elementary are his talents and aspirations--nor how high. We measure the value of talents by the archaic and misleading standards of the "academic" scale; the value of work by the kind of uniform that the worker wears; and the value of teaching by the age of the children in the classroom.

When we speak of the "status" of technical education, we speak not of a degree of honor or respectability connected with it, but of the fact that it makes certain kinds of demands upon its students, and that they must possess certain kinds of talents to profit by it. We believe that it is important to state clearly that technical education is neither more nor less important than vocational education for the trades and crafts or education for engineers and scientists--but only that it is important if we are to accomplish the complex work of our society, and that its demands upon individual students requires talents to master certain kinds of knowledge and to develop certain kinds of complex skills that most appropriately belong in the sector of our educational system that we have come to view as "higher" education--whatever that may really mean.

It was pointed out in the conference that the combination and level of manipulative and cognitive skills and talents required by the highly

trained technician are not well enough understood by high school students, teachers, and counselors. This results in choice of technical education programs by many students who are not suited for them, and rejection of technical education by many students who are qualified and who would do well.

Members of the conference discussed numerous other problems which have a bearing of one kind or another on the status of technical education--recruitment of qualified faculty, the formulation and administration of legislation affecting vocational and technical education, accrediting of institutions and programs, the development of technical education curricula, and the attitudes of employers in recruitment and utilization of technicians, to name a few.

The recommendations of the conference urged that: "Greater efforts should be made to identify technical education more closely with higher education--but with the preservation of its unique mission and goals," and stated that: "The widespread misconceptions about the goals and nature of technical education, and about the kinds and level of work that technicians perform, should be dispelled by a vigorous program of public information."

The conference also recommended that: "Continuing study should be made of the various kinds of regulatory influences--public and private, voluntary and involuntary--that affect technical education. . . in order to make more evident the ways in which the best interests of technical education can be served through cooperation by agencies and organizations that have regulatory responsibilities and functions."

The conference noted that: "Federal and state legislative bodies have enacted important legislation intended to encourage and support technical education. Rapidly changing conditions require that this legislation be kept up-to-date. Technical educators and administrators should review these laws continually and provide advice to governmental legislative agencies for the amendment of existing laws or the enactment of new ones, as needed."

I believe that it is fair to say that there was a general agreement among the members of the conference that the most potent forces for strengthening technical education as a vigorous sector of American higher education with a clearly recognized identity will come from within the technical education community itself. In an era characterized by an erosion of values, technical education will need to resist pressures to lower the standards and criteria for excellence that have been established. There is need to develop much closer relationships with other sectors of higher education; the greater part of the initiative will have to come from technical educators.

The problems of determining the nature of the science and mathematics content of technical education programs requires much greater participation by scientists and mathematicians in other kinds of higher educational institutions. It has been demonstrated that scientists are willing and

even eager to provide advice and assistance in this kind of activity--but the opportunities will have to be made clear to them by those who are responsible for the development of curricula and courses for technical education programs. A primary function of the State Academies of Science is to be of service to local institutions of many kinds. The establishment of cooperative relationships between community colleges and local members of the State Academies would almost certainly produce benefits that would be mutually advantageous.

In this era, education as a whole is undergoing a transformation. The focus of education is shifting from preoccupation with knowledge, per se, to primary concern with the needs of people. In the words of the Advisory Council on Vocational Education, ". . . never before has attention to the individual been so imperative."

The most difficult problem for technical education in the years ahead will be to respond adequately to the mounting pressures of social, economic, cultural, and technological change. Education has existed as an almost autonomous institution little affected by the forces generated in a society seeking maturity. In the span of less than a generation, however, education has moved from the hilltop to the storefront, and the staid old institution no longer is in full control of its own processes.

The need for change to meet new and emerging needs was recognized in the AAAS Conference on Science in Technical Education. The final recommendation was that:

> A study should be made of new instructional techniques to discover those that may be adaptable to technical education. Information about them should be disseminated widely.
>
> Much experimentation already is being done by technical education institutions in efforts to improve methods and general pedagogic approaches for technical education. These projects should be encouraged in every way and information about successful ones should be made available throughout the technical education community. Additional comprehensive experimental and developmental programs are needed, particularly ones that will seek to discover basically new approaches to the patterns of technical education in general.

In October 1968 the Commission on Science Education reviewed the report of the conference and concluded that "the need for educating larger numbers of highly trained technicians is reaching the critical stage, and there is as much reason now for national concern about technical education as there was for concern about the education of scientists and engineers two decades ago." The Commission also stressed the responsibility that has been placed upon higher education in general for the continued strengthening of technical education, especially in view of the increasing funds being made available for this purpose, and called for cooperation by employers and federal, state, and local governmental agencies in the overall effort. The Commission noted that technical education has not had the recognition as a part of higher education that it must have to accomplish its mission fully,

and concluded that: "Major cooperative efforts must be made, as soon as possible, (1) to alleviate present problems in technical education as it now exists, while (2) experimentation proceeds to find new approaches that will make it possible for technical education to meet the rapidly changing and mounting demands of the future."

Thinking about imaginative new approaches to technical education should not be limited by models of organization and methodology that may have served in the past but that are too restricted and cumbersome to serve the needs of the future. Participation by students, leavened by the wisdom and experience of their teachers, in the fashioning of their own educational programs should not be ruled out. All of the developments of educational technology and learning theory should be carefully examined and tried if they show promise of increasing the effectiveness of the educational process. This is not to say that we should embark upon lightly considered, superficial deviations from tradition of the type that characterized much of the "progressive education" era in elementary school education. What we do say is that education is becoming increasingly complex, and that problems of curriculum building and of the development of instructional materials are, in themselves, a new technology requiring the expertise and participation of specialists of many kinds. Our task is to synthesize, to bring the diverse but essential elements together, and to create new learning situations that will be more effective than the old ones have been.

We are speaking not only of the substance and content of technical education, but also of organization and management. An example of a kind of new approach in this category has just been offered for consideration by the American Association of Junior Colleges in General Education in Occupational Programs Offered by Junior Colleges* in which a complete restructuring of the junior and community college offering both occupational and transfer programs is proposed. The essence of the proposal is contained in the following statement:

> One of the persistent problems in the junior college today is the schism between the faculty and students in the occupational programs and the faculty and students in the transfer programs. Perhaps one way of bridging the chasm between the two groups would be to restructure the organizational patterns of the college.
>
> Looking at the occupational programs which are offered, it seems that we should consider setting up the divisions in the college somewhat along these lines:
>
> - Communications and related technologies
> - Behavioral science and related technologies
> - Social sciences and related technologies
> - Science and mathematics and related technologies
> - Humanities and related technologies

*Wiegman, Robert R., General Education in Occupational Programs Offered by Junior Colleges, American Association of Junior Colleges, Washington, D. C., 1969 ($1.50).

> In other words, each division would include all technical offerings related to it. I believe that we could place each occupational program very appropriately in one of these divisions.

Many other serious efforts at innovation are going on in many places. The programs of the Technical Education Research Center (TERC) are illustrative, including the work of Dr. Maurice Roney and his staff at Oklahoma State University in the development of a multidisciplinary technical curriculum in Electro-mechanical Technology in which science, mathematics, technology, and communication skills are combined in an integrated program.

The Commission on Science Education proposed that the work of the Task Force on Technical Education be continued "in order to bring the needs of technical education more forcefully to the attention of the scientific community at large, and to enlist the assistance of scientists in efforts to improve technical education."

The Task Force was encouraged to seek ways to carry out several specific projects. Two of these were announced in the extra feature issue of the Occupational Education Bulletin of February 15, 1969. The first is a study of Innovation and Experimentation in Technical Education Programs, and the second is a study of Cooperative Work-Study Technical Education Programs. The Task Force will depend upon voluntary responses to these requests for information. Some responses already have been received.

Other activities that have been recommended to the Task Force by the Commission include working in cooperation with the NSF-supported College Commissions on the development of plans for the improvement of preservice and continuing education for teachers in technical education programs; analysis and evaluation of the science and mathematics components in a sample of technical education curricula to obtain a clearer view of the problems that need to be attacked; a review of the relevance of science and mathematics offerings to the needs and interests of high school students who may be candidates for technical education; examination of the feasibility of developing an entire technical education curriculum in an emerging or neglected technical field, employing to the greatest practical extent the most productive aspects of modern learning theory and the most effective techniques of modern educational technology; and preparation of an analysis of a sample of outstanding technical education programs to determine the factors that contribute to their success.

In conclusion, although technical education in junior and community colleges is even now a large-scale educational enterprise, it is still young. Its many problems are well recognized. Its form and processes are modeled generally after patterns that are rapidly becoming outmoded and inadequate to meet the needs of the future. Technical education is, indeed, "a growing challenge in American higher education." There is opportunity--in fact, obligation--on the part of every administrator, department head, and faculty member to help fashion new approaches and new systems, without particular reference to the past. There is opportunity for imagination and innovation in higher education on an unprecedented scale. From now on, if formal education is to succeed in this country,

the school must look first to the student and his needs rather than coldly serving out its predetermined "offerings."

It is true that in the public mind the technical division of the junior and community college does not have the "status" that it ought to have. There has not yet been time, and its mission has not yet been clearly recognized. Technical educators and the administrators of their colleges should look to the creation of a new kind of institution where the students know that their needs are being met. The reason that the problem has not been solved is that it is so complex. It is certain, however, that as new rational and meaningful ideas appear there will be support from the community, state and federal governmental agencies, and the scientific community in general.

The Commission on Science Education and the Task Force on Technical Education wish to express appreciation to members of the technical education community, and to those in government and industry with whom we have worked, for the wholehearted cooperation that we have received. We see our basic mission as being to help bring scientists and technical educators into closer cooperation, and we believe that this can be done in many ways. We feel that something has been accomplished in this first year, but that whatever the Commission and the AAAS can contribute in the future will depend upon the continued assistance and advice from you and your colleagues.

UNIVERSITY OF CALIF.
LOS ANGELES

APR 19 1969

CLEARINGHOUSE FOR
JUNIOR COLLEGE
INFORMATION